EXPRESS MAIL CERTIFICATE

Date_____ Label No._____
I hereby certify that, on the date indicated above, this paper or fee was deposited with the U.S. Postal Service & that it was addressed for delivery to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 by "Express Mail Post Office to Addressee" service.

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Name (Print) Signature

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Docket No.: 5986/1007686-US5

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: John W. Barnwell

Serial No: 09/667,130 Examiner : Patricia Duffy

Filed: September 21, 2000 Art Unit: 1645

For: POLYNUCLEOTIDES ENCODING PLASMODIUM VIVAX BLOOD STAGE ANTIGENS, ANTIBODIES, AND DIAGNOSTIC ASSAYS

DECLARATION OF JOHN W. BARNWELL, Ph.D.

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I hereby declare:

1. I am the sole inventor of the referenced patent application (the "present application"). I have a Ph.D. conferred in 1980 by the University of Hawaii School of Medicine, Department of Tropical Medicine and Medical Microbiology, and I have had over 20 years of research experience in the parasitology of malaria with substantial emphasis on molecular parasitology of malaria. I am currently employed as Senior Biomedical Research Scientist by the National Center for Infectious Diseases, Division of Parasitic Diseases, Center for Disease Control and Prevention, and I am an author of about 80 full-length scientific publications in peer-reviewed journals. A full copy of my Curriculum Vitae is attached as Exhibit F.

2. I have reviewed the present application, the claims currently pending and the March 26, 2003 Official Action.

3. I have been asked by patent counsel to comment on the items detailed in the following paragraphs 4 and 5:

4. I understand from patent counsel that the claims of this application have been rejected as failing to describe the invention in such a way as to convey to the skilled artisan that I was in possession of the claimed invention at the time the application was filed.

5. I understand further that the Patent Examiner is of the opinion that a person of ordinary skill in the art would not recognize that the sequence set forth in SEQ ID NO: 2, in Figure 5, is the full open reading frame of PvESP-1.

6. I am making this declaration to address the Patent Examiner's assertion that a skilled artisan would not be able to recognize that the sequence set forth in SEQ ID NO: 2 is the full open reading frame of PvESP-1.

7. The following is a list of the references cited in this declaration:

   A. Kozak, "At Least Six Nucleotides Preceding the AUG Initiator Codon Enhance Translation in Mammalian Cells", J. Mol. Biol. (1987), 196(4): 947-50;

   B. Galinski et al., "A Reticulocyte-Binding Protein Complex of *Plasmodium vivax* Merozoites", Cell (1992), 69: 1213-26;

   C. Nicholls et al., "An S antigen gene from *Plasmodium falciparum* contains a novel repetitive sequence", Mol. Biochem. Parasitol. (1988), 28: 11-20;

D. Galinski et al., "*Plasmodium vivax* merozoite surface protein-3 contains coiled-coil motifs in an alanine-rich central domain", Mol. Biochem. Parasitol. (1999), 101: 131-47.

Copies of these references are attached as Exhibits A-D.

8. Attached is a copy of original Figure 5 of the subject specification, which contains the sequence of PvESP-1, SEQ ID NO: 2 (Exhibit E). Figure 5 shows the actual nucleic acid and deduced amino acid translation of PvESP-1.

9. The sequence in Figure 5 includes an exon I encoding a classic signal peptide at its N-terminal, a 139 bp intron, and an exon II encoding the remainder of the PvESP-1 protein. The sequence also contains a start codon, ATG, at bp 22 and a TAA stop codon at bp 3194. The start codon is preceded at position -3 by a base A. This is a well known hallmark of Kozak's consensus sequence motif for start codons.[1] The intron has 5' and 3' splice sites of GTAA and CAG, respectively, and the 3' splice site is preceded by a pyrimidine tract of T and C. The intron is also AT rich and contains TATATA motifs which are typical of *Plasmodium* introns.[2]

10. Therefore, if a person with an understanding of the biochemistry of *Plasmodium* proteins were to look at the sequence depicted in Figure 5, he or she would conclude that the sequence presented is a full open reading frame rather than a fragment.

11. I am aware of the fact that the specification refers to the sequence depicted in Figure 5 as a

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[1] Kozak, J. Mol. Biol. (1987), 196(4): 947-50 (Exhibit A).

[2] Galinski et al., Cell (1992), 69: 1213-26 (Exhibit B).

fragment. I believe this is an error. In reviewing the final draft of the application before it was filed, I must have inadvertently overlooked the characterization of the sequence in Figure 5 as a fragment. Therefore, this erroneous statement remained in the present application. Nevertheless, it prompts no inference that I was not in possession of the full open reading frame of PvESP-1 at the time the application was filed. On the contrary, for the reasons given in paragraph 5, I knew that the sequence depicted in Figure 5 was the full open reading frame of PvESP-1 at the time the application was filed. In any event, the sequence of Figure 5 speaks for itself, and whether I or anyone else called it a fragment does not alter the fact that it depicts the entire polypeptide PvESP-1. The sequence is the blueprint of the protein. If any confirmation were desired, it could be easily obtained by 5' reverse transcriptase polymerase chain reaction amplification of messenger RNA, or by N-terminal sequencing of the native protein, which are well-known techniques. Such confirmation is not necessary, however.

12. Further, while there is a discrepancy between the calculated molecular weight of the protein shown in Figure 5 and that observed by SDS-PAGE, such discrepancies are common among *Plasmodium* proteins because such proteins contain repeated proline-rich amino acid motifs that introduce rigidity into the structure of the proteins, making them less susceptible to denaturation by SDS.[3] Therefore, the protein was not completely denatured and cannot be completely denatured. Hence, it was incompletely resolved by the gel matrix. This accounts for the discrepancy between the calculated molecular weight for PvESP-1 and the molecular weight obtained on SDS-PAGE.

12. I further declare that all statements made of my knowledge are true and that all statements made on information and belief are believed to be true, and that these statements and the

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[3] Nicholls et al., Mol. Biochem. Parasitol. (1988), 28: 11-20 (Exhibit C); and Galinski et al., Mol. Biochem. Parasitol. (1999), 101: 131-47 (Exhibit D).

like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: September 23, 2003

John W. Barnwell

CURRICULUM VITAE: JOHN WESLEY BARNWELL

TITLE: Senior Biomedical Research Scientist

BIRTHDATE: May 6, 1948

PLACE OF BIRTH: Salem, Oregon, U.S.A.

MILITARY SERVICE: United States Army, Medical Service Corps, 1968 to 1971. Clinical Specialist Training School, Brooke General Hospital, Ft. Sam Houston, Texas, 1968-69; 5th Medical Battalion, Chief Medic, RECONDO Training School, Ft Carson, Colorado, 1969-70; 269th Aviation Battalion, 431st Medical Detachment, Clinical Specialist & Chief Medic, 25th Infantry Division, Cu Chi and Long Binh, Vietnam, 1970-71.

EDUCATION:

1974	B. Sc.	Oregon State University, Corvallis, Oregon, USA Department of Microbiology (Medical & Environmental Microbiology)
1976	M.P.H.	University of Hawaii (Manoa) School of Public Health, Honolulu, Hawaii, USA Department of Epidemiology and Biostatistics (Epidemiology and Public Health laboratory)
1980	Ph.D.	University of Hawaii (Manoa) School of Medicine, Honolulu, Hawaii, USA Department of Tropical Medicine & Medical Microbiology (Biomedical Sciences - Tropical Medicine)

Dissertation/Thesis Research: Studies on Parasitemic Crisis in *Plasmodium berghei* Infected Rats.
Dissertation/Thesis Advisor: Robert S. Desowitz, Ph.D., D.Sc.

POSTDOCTORAL TRAINING:

1980 – 1983	Senior Staff Fellow in Malaria Section, Laboratory of Parasitic Diseases, National Institutes of Allergy and Infectious Diseases, National Institutes of Health Bethesda, Maryland, USA, Supervisor: Louis H. Miller, M.D.

ACADEMIC APPOINTMENTS:

1998 - present	Senior Biomedical Research Scientist Division of Parasitic Diseases National Center for Infectious Diseases Centers for Disease Control and Prevention Atlanta, Georgia, USA

1991 – 1998	Associate Professor (with tenure) Department f Medical and M lecular Parasitology New York University School of Medicine New York, New York, USA
1983 – 1990	Assistant Professor Department of Medical and Molecular Parasitology New York University School of Medicine New York, New York, USA
1978 – 1980	Research Assistant Department of Tropical Medicine and Medical Microbiology School of Medicine, University of Hawaii Honolulu, Hawaii, USA Supervisor: Robert S. Desowitz, Ph.D., D.Sc.
1976 – 1978	Teaching Assistant Department of Tropical Medicine and Medical Microbiology School of Medicine and School of Public Health, University of Hawaii Honolulu, Hawaii, USA

MAJOR RESEARCH INTERESTS:

Basic research interests involve the genetic, immunological, and biological aspects of host-parasite relationships in primate and human malaria. Specifically, one major area of current research emphasis is on malaria parasite adhesin receptors that interact with host cell ligands and thus function in parasite survival through erythrocyte invasion by merozoites or tissue sequestration of *Plasmodium falciparum* infected erythrocytes and their interaction with immunological responses of the host. Much of the work on erythrocyte invasion has concentrated on the discovery and molecular characterization of the functional and structural polypeptides that are to be found in *P. vivax* merozoites which is now being extended to *P. falciparum*. A second major area of study has been directed towards the identification, molecular characterization, and functional activity of parasite proteins introduced into the host erythrocyte membrane and their role in *Plasmodium* cellular biology and immunobiology, especially in regards to the variant proteins of *P. knowlesi*, *P. coatneyi* and *P. falciparum*, mechanism and modulation of antigenic variation, and the constituent parasite proteins comprising the caveola-vesicle complexes of *P. vivax* infected erythrocytes. Other areas of research interest concerns the molecular and physiological basis of pathogenesis in malaria infections and the basis of functionally protective immunity in naturally acquired infections. Other areas of research efforts focus on interactions between parasite species and strains in a host, genetic diversity, and population genetic and dynamics of malaria parasites. Related spin-offs from the above research involve applications towards the development and deployment of species specific diagnostic assays and potentially for chemotherapeutic interventions.

TEACHING POSITIONS:

1976 to 1979	Instructor, Public Health Laboratory Course on Parasite Diagnosis and Basic Medical Parasitology Course, School of Public Health and School of Medicine University of Hawaii, Honolulu, Hawaii, USA
1983 to 1998	Parasitic Diseases Course, Department of Medical and Molecular Parasitology, New York University, School of Medicine New York, New York, USA
1985 to 1998	Faculty, Sackler Institute of Graduate Biomedical Sciences New York University, School of Medicine
1987 to 1998	Faculty, MD-PhD Program, New York University, School of Medicine

ADMINISTRATIVE RESPONSIBILITIES:

1999 to present	Chair, Peer Review Board National Center for Infectious Diseases Centers for Disease Control and Prevention Atlanta, Georgia, USA
1984 to 1998	Co-Chair, Departmental Animal Facility Committee Department of Medical and Molecular Parasitology New York University School of Medicine New York, New York, USA
1984 to 1998	Radioisotope Safety Officer Department of Medical and Molecular Parasitology New York University School of Medicine
1989 to 1992	Departmental Faculty Council Representative New York University Medical Center
1989 to 1994	Member, Academic Affairs Committee New York University School of Medicine
1995 to 1998	Founding Member, Malaria Research Network Management and Oversight Committee

PROFESSIONAL SOCIETIES:

American Society for Tropical Medicine and Hygiene
American Association for the Advancement of Science
New York Academy of Sciences
British Society for Parasitology

INVITED LECTURES and AWARDS:

Irma T. Hirschl Trust Scholar, 1991 to 1995

Invited Participant and Speaker, Ciba Foundation Symposium, Malaria and the Red Cell
London, United Kingdom, April 27-29, 1982

Invited Speaker, Gordon Conference, Erythrocyte Membrane Structure and Function
Plymouth College, New Hampshire, USA, August 5-9, 1985

Invited Speaker, The International Symposium on Malaria
Rio De Janeiro, Brazil, June 1-5, 1986

Participant and Invited Speaker, Gordon Conference on Immunologic and Molecular Aspects of Parasitism
Plymouth College, New Hampshire, USA, August 3-7, 1987

Invited Speaker, Symposium on Cell Adherence Molecules and Parasitism
American Society of Tropical Medicine and Hygiene Meeting
Los Angeles, California, November 29th to December 3, 1987

Invited Participant and Speaker, Tenth Meeting, Scientific Working Group, Immunology of Malaria
WHO, Geneva, Switzerland, April 13-15, 1988

Invited Participant for Consultation on the Role of Non-Human Primates in Malaria Vaccine Development
WHO, Geneva, Switzerland, April 18-19, 1988

Sherwood Smith Memorial Lecturer, American Red Cross
Rochester, New York, May 17, 1990

Co-chair and Summary Speaker, Symposium on Host Cell Invasion by Malaria Merozoites
American Society of Tropical Medicine & Hygiene Meeting, New Orleans, LA, 1990

Invited Speaker at IV International Congress on Malaria and Babesiosis
Rio De Janeiro, Brazil, August 13 to 17, 1991

Invited Speaker, Keystone Symposia, Molecular & Cellular Biology of Host-Parasite Interactions
Park City, Utah, January 15-20, 1992

Invited Speaker, Buffalo Conference on Microbial Pathogenesis
University of Buffalo, Buffalo, New York, April 29, 1992

Participant and Speaker, MacArthur Foundation sponsored "Workshop on Transfection of *Plasmodium*"
Airlie House, Virginia, November 6-8, 1992

Invited Speaker and Chair, Symposia on *Plasmodium vivax*
XIIIth International Congress for Tropical Medicine and Malaria
Jomtien, Thailand, November 29-December 4, 1992

Plenary Lecturer, CEC/Latin American Annual Malaria Conference
Cali, Colombia, September 8-12, 1993

Invited Plenary Speaker, British Society of Parasitology Malaria Meeting
Liverpool, United Kingdom, September 19 - 21, 1994

Invited Speaker, Roundtable on Malaria Asexual Antigens and Vaccines
International Congress of Parasitology VIII (ICOPA VIII).
Izmir, Turkey, October 10-14, 1994

Invited Speaker, Symposium on Pathogenesis in Severe Malaria
VIIIth International Congress of Parasitology
Izmir, Turkey, October 10-14, 1994

Invited Participant and Speaker, Workshop - "Genetic Transfection in Malaria Research-Development of Tools for the Future", Oestgeest, The Netherlands, July 26-29, 1995

Invited Discussant and Speaker, Symposium entitled, "Parasite Vaccines, If Yes, Why Not?" held during European Multicolloquium on Parasitology (EMOP VII), Parma, Italy, September 2-6, 1996

Invited Speaker, Keystone Symposium, "Molecular and Cellular Biology of the Apicomplexan Protozoa"
Park City, Utah, January 7 -12, 1997

Invited Lecturer, Workshop - "Biology of the Malarial Parasite"
Tata Institute for Fundamental Research, Bombay, India, August 14-16, 1997

Invited Speaker, Global Meet on Parasitic Diseases II, Sir Ronald Ross Centennary
Hyderabad, India, August 22-27, 1997

Invited Participant and Discussion Leader, Gordon Research Conference on Malaria
Somerville College, Oxford, UK, July 26-31, 1998

Invited Speaker, Symposium, "Apical Complex Organelle Proteins as Candidates for Vaccine Molecules" American Society of Tropical Medicine & Hygiene Meeting, San Juan, Puerto Rico, October 18-22, 1998

Invited Discussant, Novartis Foundation Symposium #226, "Transport and Trafficking in the Malaria-Infected Erythrocyte," London, UK, January 25-28, 1999 (Formerly the Ciba Foundation Symposia)

Invited Speaker, "Molecular Approaches to Malaria", Lorne, Victoria, Australia, February 2 to 5, 2000.

PROFESSIONAL ACTIVITIES and APPOINTMENTS:

Advisor, Instituto Evandro Chagas for TDR/WHO Institutional Strengthening Grant in Malaria and Leishmania Belem, Brazil, 1988-1992

Consultant, PAHO/WHO/TDR to National University of Honduras, Department of Microbiology and Immunolgy, Tegucigalpa, Honduras, 1989 to 1991

Reviewer for Experimental Parasitology, J. Immunology, Infection & Immunity, Blood, Molecular & Biochemical Parasitology, American J. of Tropical Medicine and Hygiene, J. of Experimental Medicine, J. f Clinical Investigation, Science, Nature, and others, 1986 -present.

Consultant and Lecturer, International Workshop on Malaria Research, Sponsored by WHO/DMR Yangoon and Mandalay, Myanmar (Burma), February 5-10,1990

Member, Editorial Board, Experimental Parasitology, 1990 to present

Ad Hoc Member, NIAID Study Section, Tropical Medicine and Parasitology, NIH Bethesda, Maryland, USA, June and October, 1990

Member, NIAID Study Section for Tropical Medicine and Parasitology, NIH Bethesda, Maryland, USA, 1991 - 1995

NIH/NIAID Study Section Reviewer Reserve, 1996-present

Member, Scientific Advisory Board, Malaria Foundation International, 1993-present

Consultant, European Commission, Malaria Asexual Blood Stage Network

Expert Consultant & NIH/NIAID liaison for European Commission Task Force (DG-XII INCO Programmes) on establishment of and guidelines for Primate Centers for Vaccine Evaluation Network (PVEN), 1994-1995

Expert Consultant, American Institute of Biological Sciences, 1994-1997

Consultant, Tropical Medicine Diagnostics, Becton Dickinson & Co., 1989-1997

Participant, meeting on Candidate Vaccines for Parasitic Diseases: Assessment of Feasibility for Production and Testing, NIH, Bethesda, Maryland, September 14-15, 1993

Participant, WHO/TDR and NIH sponsored meeting on Review of Progress for AMA-1 as a Candidate Vaccine Antigen, NIH, Bethesda, Maryland, April 25, 1995

Discussion Leader (Malaria Blood Stages), meeting on Planning and Implementing Clinical Trials of Vaccines for Parasitic Diseases of Humans, NIAID, NIH, September 19-21, 1995

Expert Consultant, European Commission (DG-XII INCO Programmes) Advisory Group on Establishment of Guidelines and Recommendations for Pre-Clinical Trial Models in Parasitic Diseases, 1995-1996

Participant, WHO/TDR and NIH sponsored Review of Progress Made on Advancing EBA-175 and the Duffy Binding Protein as Vaccine Antigens, NIH, Bethesda, Maryland, September 22, 1996

Expert Consultant, Review of Centers for Disease Control and Prevention, Division of Parasitic Diseases Malaria Research and Service Programs, November 1996

Expert Consultant, Malaria Genome Sequencing Consortium Program, 1996 - present

Member, Editorial Board, American Journal of Tropical Medicine and Hygiene, 1996 to present

Member, Delegation to India for Indo-US Vaccine Action Program to establish collaborations in malaria research between US and Indian scientists and institutions from several areas of India, January 31 to February 15, 1997

Participant, Malaria Genome Focus Group Meeting on current and post-genomic sequencing tools and resource needs sponsored by the Burroughs Wellcome Fund and convened by the Malaria Foundation Rockville, MD, April 7, 1997

Coordinator, *Plasmodium vivax* Genome Project Network, 1997 to present

Participant and Discussant, WHO/TDR and NIH sponsored Review of Progress EBA-175 and the Duffy Binding Protein as Vaccine Candidates, NIH, Bethesda, Maryland, September 24, 1998

CURRENT RESEARCH FUNDING:

1) NIH/NIAID R01 AI24710-11: "Molecular Analysis of *Plasmodium vivax* Surface Antigens"

Co-Investigator (PI, Mary R. Galinski), Award Dates: 03/01/87 to 02/28/01

Current year direct costs: $215,539; Current year total costs: $347,018

The major goal of this project is to identify, characterize, and functionally analyze *Plasmodium vivax* merozoite proteins that may have direct and secondary participatory roles in the mechanism of erythrocyte recognition and invasion.

Competitive renewal (October 1995): priority score: 112; percentile score: 0.3
Competitive renewal (November 1991): priority score: 128; percentile score: 2.8

2) NIAID 1 RO1 AI35804-01A1: "Molecular Analysis of Antigenic Variation in Malaria"

Co-investigator (PI, M.R. Galinski), Award Dates: 08/01/96-07/31/01

Current year direct costs: $204,318; Current year total costs: $328,952

The major goal of this project is to provide basic genetic and mechanistic information about antigenic variation of the SICA*var* gene family in malaria parasites using the well-defined biological host-parasite model system comprised of *Plasmodium knowlesi* and rhesus monkeys (*Macaca mulatta*).

Initial review (February, 1996): priority score: 125; percentile score: 6.3

PAST RESEARCH GRANTS AND AWARDS:

1) UNDP/World Bank/WHO/TDR #950440 & 910495: "Molecular Basis for the Development of Malaria Blood Stage Vaccines Against *P. vivax* and *P. falciparum*"

Co-investigator, (PI, M.R. Galinski), Award Dates: 12/01/92 to11/30/97

Final year direct costs: $55,684; Total costs: $266,761

The major goal of this project is to train a fellow to study immunological and epidemiological aspects of several *P. vivax* merozoite surface proteins and work to identify and characterize analogous proteins from *P. falciparum.*

2) USAID/NIAID U01 AI36466-03. "Malaria Merozoite Apical/Surface Antigens as Immunogens in *Plasmodium falciparum* "

Principal Investigator, Award Dates: 09/01/94 to 08/31/97

Final year direct costs: $115,106; Final year total costs: $176,052

The major goal of this project is to characterize several novel apical membrane proteins of *P. falciparum,* which we have discovered and have cloned the corresponding genes, in relation to function in invasion, immunobiology, and potential as vaccine targets.

3) USAID/NIAID U01 AI37545-03: "Development of a Vivax Malaria Blood Stage Vaccine"

Co-investigator, (PI, M.R. Galinski), Award Dates: 08/18/93 to 7/31/96

Final year direct costs: $121,665; Final year total costs: $203,789

The goals of this project were to design and produce recombinant constructs and expression products for three *P. vivax* merozoite surface proteins and to evaluate antigenic and immunogenic immune responses in rabbits immunized with the recombinant proteins. The diversity/polymorphism in the *P. vivax* MSP genes and deduced proteins were also analyzed.

4) Irma T. Hirschl Trust Scholars Award: "Molecular Cell Biology of Plasmodium Blood Stages"

Scholar Investigator, Award Dates: 01/01/91 to 12/31/95

Direct costs: $20,000 per annum; Total costs: $100,000

Support for varied molecular and biological studies pertaining to immunobiology and host-parasite relationships of human and primate malaria parasites.

5) Becton-Dickinson and Company: "Immunodiagnosis of Vivax Malaria"

Principal Investigator, Award Dates: 12/01/ 89 to 11/30/93

Direct costs: $50,000 per annum; Total costs: $200,000

The goal of this sponsored research was the discovery of suitable *Plasmodium vivax* antigens and the production monoclonal antibodies to be used in the development of a chromatographic dipstick test for the serological detection of antigenemia specific for *P. vivax* infections. The test is currently being prepared for marketing by the Tropical Diagnostics Division of Becton-Dickinson & Co.

6) USAID Contract DPE-5979-A-00-0006: "Multivalent Malaria Vaccine: Immune Mechanism and Design"

Project Investigator, Award Dates: 04/01/85 to 03/31/93

Final year direct costs: $129,640; Final year total costs: $213,906

The development of sporozoite and blood stage vaccines against *Plasmodium falciparum* and *P. vivax*. Studies on the molecular cell biology of human *Plasmodium* and immunobiology of primate malaria parasites in primates and invertebrate hosts.

PATENTS:

Patent Number: 5,532,133; Patent Date: July 2, 1996
"*Plasmodium vivax* Blood Stage Antigens, PvESP-1, Antibodies, and Diagnostic Assays."
Inventor: John W. Barnwell; Assignee: New York University

Patent Number: 5,646,247; Patent Date: July 8, 1997
"Merozoite Antigens Localized at the Apical End of the Parasite."
Inventors: John W. Barnwell and Mary R. Galinski; Assignee: New York University

Pending Patent Number (French): 9,601,821; Filing Date: February 14, 1996
"Proteine Recombinante Contenant un Fragment C-terminal de la Proteine MSP-1 d'un Plasmodium Infectieux pour des Mammiferes, Notamment L'Homme pour la Production de Vaccins Anti-Paludiques."
Invent rs: Shirley Longacre, Peter H. David, John W. Barnwell, and others

BIBLIOGRAPHY:

Desowitz, R.S. and **Barnwell, J.W.** 1976. *Plasmodium berghei:* Deep vascular sequestration of young forms in the heart and kidney of the white rat. Ann. Trop. Med. Parasit. 70: 475-477.

Barnwell J.W. and Desowitz, R.S. 1977. Studies on parasitic crisis in malaria: I. Signs of impending crisis in *Plasmodium berghei* infections of the white rat. Ann. Trop. Med. Parasitol. 71 (4): 429-31.

Desowitz, R.S., **Barnwell, J.W.** and Palumbo, N.E. 1978. Rapid decrease of precipitating and reagenic antibodies in *Dirofilaria immitis* infected dogs which develop severe adverse reactions following treatment with diethylcarbamazine. Am. J. Trop. Med. Hyg. 27: 1148-1151.

Desowitz, R.S. and **Barnwell, J.W.** 1980. Effect of selenium and diethyl dioctadecyl ammonium bromide on the vaccine-induced immunity of Swiss-Webster mice against malaria (*Plasmodium berghei*). Infect. and Immun. 27: 87-90.

Desowitz, R.S., Rudoy, R. and **Barnwell, J.W.** 1981. Antibodies to canine helminth parasites in asthmatic and nonasthmatic children. Int. Arch. Allergy and Appl. Immunol. 65: 361-365.

Barnwell, J.W., Howard, R.J. and Miller, L.H. 1982. Altered expression of variant antigen in *Plasmodium knowlesi* after passage in splenectomized rhesus monkeys. J. Immunol. 128: 224-226.

Schmidt, J.A., Udeinya, I.J., Leech, J.H., Hay, R.J., Aikawa, M. **Barnwell, J. W.**, Green, I. and Miller, L. H. 1982. *Plasmodium falciparum* malaria: An amelanotic melanoma cell line bears receptors for the knob ligand on infected erythrocytes. J. Clin. Invest. 70: 379-383.

Howard, R.J., **Barnwell, J.W.**, Kao, V., Daniel, W.A. and Aley, S.B. 1982. Radio-iodination of new protein antigens on the surface of *Plasmodium knowlesi* schizont-infected erythrocytes. Mol. Biochem. Parasitol. 6: 343-367.

Howard, R.J., **Barnwell, J.W.** and Kao, V. 1982. Tritiation of protein antigens of *Plasmodium knowlesi* schizont-infected erythrocytes using pyridoxal phosphate-^{3}H-sodium borohydride. Mol. Biochem. Parasitol. 6: 369-387.

Barnwell, J.W., Howard, R.J., Coon, H.G. and Miller, L.H. 1983. Splenic requirement for antigenic variation and variant antigen expression in cloned *Plasmodium knowlesi* malaria. Infect. and Immun. 40 (3): 985-994.

Howard, R.J., **Barnwell, J.W.** and Kao, V. 1983. Antigenic variation in *Plasmodium knowlesi* malaria: Identification of the variant antigen on infected erythrocytes. Proc. Natl. Acad. Sci. 80: 4129-4133.

Barnwell, J.W., Howard, R.J., and Miller. L.H. 1983. The influence of the spleen on the expression of surface antigens on parasitized erythrocytes. In: Malaria and the Red Cell, CIBA Foundation Symposium #94: 117-136.

Howard, R.J. and **Barnwell, J.W.** 1984. Solubilization and immuno-precipitation of ^{125}I-labelled malarial antigens from *Plasmodium knowlesi* schizont-infected erythrocytes using nonionic, anionic and Zwitterionic detergents: Parasitol. 88: 27-36.

Howard, R.J. and **Barnwell, J.W.** 1984. The detergent solubility properties of a malarial (*Plasmodium knowlesi*) variant antigen expressed on the surface of infected erythrocytes. J. Cell. Biochem. 24:297-306.

Leech, J.H., **Barnwell, J.W.**, Miller, L.H. and Howard, R.J. 1984. Identification of a strain-specific malarial antigen exposed on the surface of *P. falciparum* infected erythrocytes. J. Exp. Med. 159: 1567-1572.

Leech, J.H., **Barnwell, J.W.**, Aikawa, M. and Miller, L.H., Howard, R.J. 1984. *Plasmodium falciparum* malaria: Association of knobs on the surface of infected red blood cells with a malarial histidine-rich protein and the red cell skeleton. J. Cell. Bi l. 98: 1256-1260.

Howard, R.J., Kao, V. and **Barnwell, J.W.** 1984. Protein antigens of *Plasmodium knowlesi* clones f different variant antigen phenotype. Parasitol. 88: 221-237.

Aley, S.B., **Barnwell, J.W.**, Daniel, W. and Howard, R.J. 1984. Identification of parasite proteins in a surface membrane preparation enriched in *Plasmodium knowlesi* infected erythrocyte membranes. Mol. Biochem. Parasitol. 12: 69-76.

McCutchan, T.F., Dame, J.B., Miller, L.H. and **Barnwell, J.W.** 1984. Evolutionary relatedness of *Plasmodium* as determined by the structure of DNA. Science 225: 808-811.

Howard, R.J., Lyon, J.A., Diggs, C.L., Haynes, D.J., Leech, J.H., **Barnwell, J.W.**, Aley, S.B., Aikawa, M. and Miller, L.H. 1984. Localization of the major *Plasmodium falciparum* glycoprotein on the surface of mature intraerythrocytic trophozoites and schizonts. Mol. Biochem. Parasitol. 11: 340-349.

Gysin, J., **Barnwell, J.W.**, Schlesinger, D.H., Nussenzweig, V., Nussenzweig,R. S. 1984. Neutralization of the infectivity of sporozoites of *Plasmodium knowlesi* by antibodies to a synthetic peptide. J. Exp. Med. 160 (3): 935-940.

Smith, G.L., Godson, N.G., Nussenzweig, V., Nussenzweig, R.S., **Barnwell, J.W.** and Moss, B. 1984. *Plasmodium knowlesi* sporozoite antigen: expression by infectious recombinant vaccinia virus. Science 224: 397-399.

Clough, E.R., Audibert, F.M., **Barnwell, J.W.**, Schlesinger, D.H., Arnon, R., and Chedid, L. 1985. Biologically active antibodies elicited by a synthetic peptide of *Plasmodium knowlesi* administered in saline with a muramyl dipeptide derivative. Infect. & Immun. 48:839-842.

Clough, E.R., Jolivet, M., Audibert, F.M., **Barnwell, J.W.**, Schlesinger, D.H., and Chedid, L. 1985. Production of anti-sporozoite antibodies in absence of response to carrier by coupling an MDP derivative to a malaria peptide-tetanus toxoid conjugate. Biochem. & Biophys. Res. Comm. 131:70-76.

Howard, R.J. and **Barnwell, J.W.** 1985. Immunochemical analysis of surface membrane antigens on erythrocytes infected with non-cloned SICA[+] or cloned SICA[-] *Plasmodium knowlesi*. Parasitology 91: 245-261.

Barnwell, J.W., Ockenhouse, C.F. and Knowles, D.M. II. 1985. Monoclonal antibody OKM5 inhibits the in vitro binding of *Plasmodium falciparum*-infected erythrocytes to monocytes, endothelial and C32 melanoma cells. J. Immunol. 135: 3494-3497.

Cochrane, A.H., **Barnwell, J.W.**, Collins, W.E. and Nussenzweig, R.S. 1985. Monoclonal antibodies produced against sporozoites of the human parasite *Plasmodium malariae* abolish infectivity of sporozoites of the simian parasite *Plasmodium brasilianum*. Infect. and Immun. 50: 58-61.

Arnot, D.E., **Barnwell, J.W.**, Tam, J.P., Nussenzweig, V., Nussenzeig, R.S. and Enea, V. 1985. Circumsporozoite protein of *Plasmodium vivax*: gene cloning and characterization of the immunodominant epitope. Science 230: 815-818.

Sherwood, J.A., Marsh, K., Howard, R.J. and **Barnwell, J.W.** 1985. Antibody mediated strain-specific agglutination of *Plasmodium falciparum* parasitized erythrocytes visualized by Ethidium bromide staining. Parasite Immunol. 7: 659-663.

Leech, J.H., **Barnwell, J.W.**, Aikawa, M. and Miller, L.H., Howard, R.J. 1984. *Plasmodium falciparum* malaria: Association of knobs on the surface of infected red blood cells with a malarial histidine-rich protein and the red cell skeleton. J. Cell. Biol. 98: 1256-1260.

Howard, R.J., Kao, V. and **Barnwell, J.W.** 1984. Protein antigens of *Plasmodium knowlesi* clones of different variant antigen phenotype. Parasitol. 88: 221-237.

Aley, S.B., **Barnwell, J.W.**, Daniel, W. and Howard, R.J. 1984. Identification of parasite proteins in a surface membrane preparation enriched in *Plasmodium knowlesi* infected erythrocyte membranes. Mol. Biochem. Parasitol. 12: 69-76.

McCutchan, T.F., Dame, J.B., Miller, L.H. and **Barnwell, J.W.** 1984. Evolutionary relatedness of *Plasmodium* as determined by the structure of DNA. Science 225: 808-811.

Howard, R.J., Lyon, J.A., Diggs, C.L., Haynes, D.J., Leech, J.H., **Barnwell, J.W.**, Aley, S.B., Aikawa, M. and Miller, L.H. 1984. Localization of the major *Plasmodium falciparum* glycoprotein on the surface of mature intraerythrocytic trophozoites and schizonts. Mol. Biochem. Parasitol. 11: 340-349.

Gysin, J., **Barnwell, J.W.**, Schlesinger, D.H., Nussenzweig, V., Nussenzweig,R. S. 1984. Neutralization of the infectivity of sporozoites of *Plasmodium knowlesi* by antibodies to a synthetic peptide. J. Exp. Med. 160 (3): 935-940.

Smith, G.L., Godson, N.G., Nussenzweig, V., Nussenzweig, R.S., **Barnwell, J.W.** and Moss, B. 1984. *Plasmodium knowlesi* sporozoite antigen: expression by infectious recombinant vaccinia virus. Science 224: 397-399.

Clough, E.R., Audibert, F.M., **Barnwell, J.W.**, Schlesinger, D.H., Arnon, R., and Chedid, L. 1985. Biologically active antibodies elicited by a synthetic peptide of *Plasmodium knowlesi* administered in saline with a muramyl dipeptide derivative. Infect. & Immun. 48:839-842.

Clough, E.R., Jolivet, M., Audibert, F.M., **Barnwell, J.W.**, Schlesinger, D.H., and Chedid, L. 1985. Production of anti-sporozoite antibodies in absence of response to carrier by coupling an MDP derivative to a malaria peptide-tetanus toxoid conjugate. Biochem. & Biophys. Res. Comm. 131:70-76.

Howard, R.J. and **Barnwell, J.W.** 1985. Immunochemical analysis of surface membrane antigens on erythrocytes infected with non-cloned SICA[+] or cloned SICA[-] *Plasmodium knowlesi*. Parasitology 91: 245-261.

Barnwell, J.W., Ockenhouse, C.F. and Knowles, D.M. II. 1985. Monoclonal antibody OKM5 inhibits the in vitro binding of *Plasmodium falciparum*-infected erythrocytes to monocytes, endothelial and C32 melanoma cells. J. Immunol. 135: 3494-3497.

Cochrane, A.H., **Barnwell, J.W.**, Collins, W.E. and Nussenzweig, R.S. 1985. Monoclonal antibodies produced against sporozoites of the human parasite *Plasmodium malariae* abolish infectivity of sporozoites of the simian parasite *Plasmodium brasilianum*. Infect. and Immun. 50: 58-61.

Arnot, D.E., **Barnwell, J.W.**, Tam, J.P., Nussenzweig, V., Nussenzeig, R.S. and Enea, V. 1985. Circumsporozoite protein of *Plasmodium vivax*: gene cloning and characterization of the immunodominant epitope. Science 230: 815-818.

Sherwood, J.A., Marsh, K., Howard, R.J. and **Barnwell, J.W.** 1985. Antibody mediated strain-specific agglutination of *Plasmodium falciparum* parasitized erythrocytes visualized by Ethidium bromide staining. Parasite Immunol. 7: 659-663.

Howard, R.J., Reuter, G., **Barnwell, J.W.** and Schauer, R. 1986. Sialoglycoproteins and sialic acids of *Plasmodium knowlesi* schizont infected erythrocytes and normal rhesus monkey erythrocytes. Parasitol. 92: 527-543.

Cochrane, A.H., Gwadz, R.W., **Barnwell, J.W.**, Kamboj, K.K. and Nussenzweig, R.S. 1986. Further studies on the antigenic diversity of the circumsporozoite proteins of the *Plasmodium cynomolgi* complex. Am. J. Trop. Med. Hyg. 35: 479-487.

Barnwell, J.W. 1986. Antigens of *Plasmodium vivax* blood stage parasites identified by monoclonal antibodies. Intern. Symp. on Malaria, Mem. Inst. Oswaldo Cruz 81 II: 59-61.

Galinski, M.R., Arnot, D.E., Cochrane, A.H., **Barnwell, J.W.**, Nussenzweig, R.S. and Enea, V. 1987. The circumsporozoite gene of the *Plasmodium cynomolgi* complex. Cell 48: 311-319.

Nichols, M.E., Rubinstein, P., **Barnwell, J.W.**, Rodriquez de Corboba, S. and Rosenfield, R.E. 1987. A new human Duffy blood group specificity defined by a murine monoclonal antibody. J. Exp. Med. 166: 776-785.

Aley, S.B., **Barnwell, J.W.**, Bates, M.D., Collins, W.E., and Hollingdale, M.R. 1987. *Plasmodium vivax*: Exoerythrocytic schizonts recognized by monoclonal antibodies against blood-stage schizonts. Exp. Parasitol. 64: 188-194.

Asch, A., **Barnwell, J.W.**, Silverstein, R., and Nachman, R. 1987. Identification of the receptor for thrombospondin. J. Clin. Invest. 79: 1054-1061.

Wanidworanun, C., **Barnwell, J.W.**, and Shear, H.L. 1987. Protective antigen in the membranes of mouse erythrocytes infected with *Plasmodium chabaudi*. Mol. Biochem. Parasitol. 25: 195-201.

Janoff, A., Roth, W.J., Sinha, S., and **Barnwell, J.W.** 1988. Degradation of plasmodial antigens by human neutrophil elastase. J. Immunol. 141: 1332-1340.

Howard, R.J., **Barnwell, J.W.**, Rock, E.P., Neequaqye, J., Ofori-Adjei, D., Maloy, W. L., Lyon, J. A. and Saul, A. 1988. Two approximately 300 kilodalton *Plasmodium falciparum* proteins at the surface membrane of infected erythrocytes. M l. Biochem. Parasitol. 27: 207-223.

Kamboj, K.K., **Barnwell, J.W.**, Nussenzweig, R.S. and Cochrane, A.H. 1988. Characterization of cross-reactive blood stage antigens of the *Plasmodium cynomolgi* complex using anti-*Plasmodium vivax* monoclonal antibodies. J. Parasitol. 74: 403-408.

Matsumoto, Y., Aikawa, M., and **Barnwell, J.W.** 1988. Immuno-electron microscopic localization of vivax malaria antigens to clefts and caveola-vesicle complexes of infected erythrocytes. Am. J. Trop. Med. & Hyg. 39: 317-322.

Arnot, D.E., **Barnwell, J.W.** and Stewart, M.J. 1988. Does biased gene conversion influence polymorphism in the circumsporozoite protein-encoding gene of *Plasmodium vivax*? Proc. Natl. Acad. Sci., U.S.A. 85: 8102-8106.

Wanidworanun, C., **Barnwell, J.W.** and Aikawa, M., Nagasawa, H. and Shear, H. L. 1989. Cross-reacting antigens to Pc96, a protective antigen of *Plasmodium chabaudi*, in *P. falciparum*, *P. vivax* and *P. cynomolgi*. Am. J. Trop. Med. & Hyg. 40: 579-584.

Barnwell, J.W., Nichols, M.E. and Rubinstein, P. 1989. In vitro evaluation of the role of the Duffy blood group in erythrocyte invasion of *Plasmodium vivax*. J. Exp. Med. 169: 1795-1802.

Barnwell, J.W., Asch, A., Nachman, R., Yamaya, M., Aikawa, M. and Ingravallo, P. 1989. A human 88 kD membrane glycoprotein (CD36) functions in vitro as a receptor for a cytoadherence ligand on *Plasmodium falciparum* infected erythrocytes. J. Clin. Invest. 84: 765-772.

Wertheimer, S.P. and **Barnwell, J.W.** 1989. *Plasmodium vivax* interaction with the human Duffy blood group glycoprotein: Identification of a parasite receptor-like protein. Exp. Parasitol. 69: 340-350.

Barnwell, J.W. 1989. Minireview: Cytoadherence and sequestration in falciparum malaria. Exp. Parasitol. 69: 407-412.

Barnwell, J.W., Wertheimer, S.P. 1989. *Plasmodium vivax*: Merozoite antigens, the Duffy blood group, and erythrocyte invasion. In: Malaria and the Red Cell 2. Alan R. Liss, Inc. pp. 1-11.

Barnw ll, J.W., Ingravallo, P., Galinski, M., Matsumoto, Y. and Aikawa, M. 1990. *Plasmodium vivax:* malaria proteins associated with the membrane bound caveola-vesicle complexes and cytoplasmic clefts structures of infected erythrocytes. Exp. Parasitol. 70: 85-99.

Barnwell, J.W. 1990. Vesicle-mediated transport of membrane and proteins in malaria-infected erythrocytes. Blood Cells 16(2-3): 379-393.

Aikawa, M., Iseki, M., **Barnwell, J.W.**, Taylor, D., Oo, M.M., Howard, R.J. 1990. The pathology of human cerebral malaria. Am. J. Trop. Med. & Hyg. 43(2/2):30-37.

Arnot, D.E., Stewart, M.J., and **Barnwell, J.W.** 1990. Antigenic diversity in Thai *Plasmodium vivax* circumsporozoite proteins. Mol. & Biochem. Parasitol. 43:147-149.

Huang, M.-M., Bolen, J.B., **Barnwell, J.W.**, Shattil, S.J., Brugge, J.S. 1991. Membrane glycoprotein IV (CD36) is physically associated with the Fyn, Lyn, and Yes protein-tyrosine kinases in human platelets. PNAS (USA) 88: 7844-7848.

Barnwell, J.W. and Galinski, M.R. 1991. The adhesion of malaria merozoites proteins to erythrocytes: A reflection of function? Research in Immunology 142: 666-672.

Galinski, M.R., Corredor Medina, C., Ingravallo, P. and **Barnwell, J.W.** 1992. A reticulocyte-binding protein complex of *Plasmodium vivax* merozoites. Cell 69: 1213-1226.

van Schravendijk, M.R., Handunnetti, S.M., **Barnwell, J.W.**, and Howard, R.J. 1992. Normal human erythrocytes express CD36, an adhesion molecule of monocytes, platelets, and endothelial cells. Blood. 80:2105-2114.

Handunnetti, S.M., van Schravendijk, M.R., Hasler, T., **Barnwell, J.W.**, Greenwalt, D.E., and Howard, R.J. 1992. Involvement of CD36 on erythrocytes as a rosetting receptor for *Plasmodium falciparum*-infected erythrocytes. Blood. 80:2097-2104.

Fujioka, H., Torii, M., **Barnwell, J.W.**, and Aikawa, M. 1992. Localization of F-actin on the caveola-vesicle complexes of erythrocytes infected with *Plasmodium vivax* and *Plasmodium cynomolgi*. Jpn. J. Parasitol. 41:361-364.

Hasler, T., van Schravendijk, M.R., Albrecht, G.R., Morehead, K.E., de Aguiar, J.C., Pasloske, B.L., Ma, C., **Barnwell, J.W.**, Greenwood, B. and Howard, R.J. 1993. An improved microassay for *P. falciparum* cytoadherence using stable transformants of CHO-cells expressing CD36 or ICAM-1. Am. J. Trop. Med. & Hyg. 48:332-347.

Asch, A.S., Liu, I., Briccetti, F.M., Barnwell, J.W., Kwakye-Berko, F., Dokun, A., Goldberger, J., and Pernambuco, M. 1993. Analysis of CD36 binding domains: ligand specificity controlled by dephosphorylation of an ectodomain. Science (Wash. D.C.) 262:1436-1440.

Barnwell, J.W. and Galinski, M.R. 1995. *Plasmodium vivax* : A glimpse into the unique and shared biology f the merozoite. Ann. Trop. Med. & Parasitol. 89(2):113-120.

Galinski, M.R. and Barnwell, J.W. 1996. *Plasmodium vivax* : Merozoites, invasion of reticulocytes, and considerations for malaria vaccine development. Parasitology Today 12(1):20-29.

Fraser, T., Michon, P., Barnwell, J.W., Noe, A., Al-Yaman F., Kaslow, D. C., and Adams, J. H. 1997. Expression and serologic activity of a soluble recombinant *Plasmodium vivax* Duffy binding protein. Infection and Immunity 65:2772-2777.

Barnwell, J.W., Galinski, M.R., Desimone, S.G., Perler, F. and Ingravallo, P. 1999. *Plasmodium vivax, P. cynomolgi* and *P. knowlesi*: Identification of homologue proteins associated with the surface of merozoites. Exp Parasitol, 91: 238-249.

Al-Khedery, B., Barnwell, J.W. and Galinski, M.R. 1999. Antigenic variation in malaria: a 3' genomic alteration associated with the expression of a *Plasmodium knowlesi* variant antigen. Molecular Cell, 3: 131-141.

Barnwell, J.W. 1999. Malaria: A new escape and evasion tactic. Nature, 398:562-563.

Galinski, M.R., Corredor-Medina, C., Povoa, M., Crosby, J., Ingravallo, P. and Barnwell, J.W. 1999. *Plasmodium vivax* merozoite surface protein-3 contains coiled-coil motifs within an alanine-rich central domain. Mol. Biochem. Parasitol., 101:131-147.

Carlton, J.M.-R, Galinski, M.R., Barnwell, J.W. and Dame, J.B. 1999. Karyotype and synteny among the chromosomes of all four species of human malaria. Mol. Biochem. Parasitol., 101:23-32.

Al-Khedery, B., Barnwell, J.W. and Galinski, M.R. 1999. Stage-specific expression of 14-3-3 in asexual blood-stage *Plasmodium*. Molec. Biochem. Parasitol., 102: 117-130.

Soares, I.S., Barnwell, J.W., Ferreira, M.U., Da Cunha, M.G., Laurino, J. P., Castilho, B.A., Rodrigues, M.M. 1999. A *Plasmodium vivax* vaccine candidate displays limited allele polymorphism, which does not restrict recognition by antibodies. Mol. Med., 5:459-470.

Bruce, M.C., Galinski, M.R., Barnwell, J.W., Snounou, G., Alpers, M., and Day, K.P. 1999. Polymorphism at the *Msp3α* locus of *Plasmodium vivax*: global and local diversity. Amer J. Trop. Med. Hyg., 61:518-525.

Bruce, M.C., Galinski, M.R., Barnwell, J.W., Snounou, G., Alpers, M., and Day, K.P., 1999. Polymorphism at the *Msp3α* locus of *Plasmodium vivax*: global and local diversity. Amer J. Trop. Med. Hyg., 61:518-25.

Bruce, M.C., Donnelly, C.A., Alpers, M.P., Galinski, M.R., Barnwell, J.W., Walliker, D., Day, K.P. 2000. Cross-species interactions between malaria parasites in humans. Science, 287:845-848.

Galinski, M.R. , Xu, M., and Barnwell, J.W. 2000. *Plasmodium vivax* Reticulocyte-Binding Protein-2 shares structural features with PvRBP-1 and the *P. yoelii* 235 kDa rhoptry protein family. Mol. Biochem. Parasitol., 108:257-62.

Bruce, M., Galinski, M.R., Barnwell, J.W., Alpers, M.P., Walliker, D., and Day, K.P. 2000. Genetic diversity and dynamics of *Plasmodium falciparum* and *P. vivax* populations in multiply infected children with asymptomatic malaria infections in Papua New Guinea. Parasitology 121:257-72.

Rayner, J.C., Galinski, M.R., Ingravallo, P., and Barnwell, J.W. 2000. Two *Plasmodium falciparum* genes express merozoite proteins that are related to *Plasmodium vivax* and *Plasmodium yoelii* adhesive proteins involved in host cell selection and invasion. Proc. Natl. Acad. Sci. *USA*, 97:9648-53.

Galinski, M.R., Al-Khedery, B., Ingravallo, P., Corredor-Medina, C. and Barnwell, J.W. 2000. *Plasmodium vivax* merozoite surface protein-3β and -3γ share structural similarities with *P. vivax* MSP-3α and define a new gene family in *Plasmodium*. Mol. Biochem. Parasitol., (in press).

Rosas-Acosta, G., Galinski, M.R. and Barnwell, J.W. 2000. Discrete regions within the Reticulocyte Binding Proteins of *Plasmodium vivax* exhibit erythrocyte-binding activity. (manuscript submitted to J. Exp. Med.)

Feldman, D., Galinski, M.R., Ingravallo, P., Rayner J.C., Iderabdullah, F., Redding, D., and Barnwell, J.W. Global survey of antigenic diversity in *Plasmodium vivax* merozoite surface protein-3α: Identification of conserved and polymorphic domains. (manuscript in preparation)

Feldman, D., Galinski, M.R., Ingravallo, P., and Barnwell, J.W. Global survey of antigenic diversity in the *Pvmsp-3β* gene: Identification of conserved and diverse domains. (manuscript in preparation)

Barnwell, J.W., Ingravallo, P., Povoa, M.,Torii, M., and Aikawa, M. *Plasmodium vivax* and *Plasmodium knowlesi*: Identification and characterization of an erythrocyte adhesive protein localized at the apical cap of the merozoite. (manuscript in preparation)

Al-Khedery, B., Barnwell, J. W., Hudson-Taylor, D., Miller, L. H., and Galinski, M. R. A closely related merozoite surface protein gene is expressed in *Plasmodium knowlesi* merozoites that have deleted the 140 kDa merozoite surface protein gene. (manuscript in preparation)

Barnwell, J. W., Longacre, S., Ingravallo, P., Galinski, M. R., and David, P. H. Antigenicity and protective efficacy in squirrel monkeys of the c-terminus of MSP-1 of *Plasmodium vivax* recombinantly expressed by baculovirus. (manuscript in preparation)

Barnwell, J.W., Rosas, G., Perlaza, B.L., Povoa, M., Chauvin, C., and Galinski, M.R. Characterization of a *Plasmodium vivax* protein, PvESP-1, that is transported to the infected erythrocyte membrane and is found as a soluble antigen in plasma. (manuscript in preparation)

Galinski, M.R., Barnwell, J.W., Aikawa, M., and Corredor-Medina, C. Characterization of a *Plasmodium vivax* gene that encodes a tyrosine-rich protein (PvCVC-1) of the caveolae-vesicle complexes of the infected erythrocyte membrane. (manuscript in preparation)

Kwakye-Berko, F., Galinski, M.R., Kula, M., Ingravallo, P., and Barnwell, J.W. Cloning of a *Plasmodium falciparum* gene that encodes a novel lysine-asparagine rich protein expressed apically in mature merozoites. (manuscript in preparation)